MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2018/2019

PEM0044 – ESSENTIAL MATHEMATICS

(All sections / Groups)

15 OCTOBER 2018
2.30 p.m. – 4.30 p.m.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of **FOUR (4)** printed pages including the cover page with 4 questions only.
2. Answer all **FOUR (4)** questions
3. Write all your answers in the answer booklet provided.
4. Only NON-PROGRAMMABLE calculator is allowed.

Question 1 (25 Marks)

a) Perform the operation and simplify the result. **(5 marks)**

$$\frac{7x}{x-2}+\frac{2}{2-x}$$

b) Simplify $(9x^4y^{-14})^{\frac{3}{2}}$. Express the answer in positive exponents. **(3 marks)**

c) Solve quadratic equation $x^2 + 12x + 21 = 0$ by completing the square. **(7 marks)**

d) Find the interval of x if given $-36 < 5x - 1 < -16$. Graph the answer. **(4 marks)**

e) Write equation of straight line containing points $(2, -9)$ and $(-2,2)$. **(6 marks)**

Question 2 (25 Marks)

Consider the following system of linear equations.

$$\begin{aligned} x + 2y + 3z &= -2 \\ x + y + z &= -8 \\ x - 2z &= 8 \end{aligned}$$

a) Write a matrix equation, $AX = B$ equivalent to the system of equations. **(2 marks)**

b) Find determinant and inverse of A. **(14 marks)**

c) Solve for x, y and z. **(9 marks)**

Continued...

Question 3 (20 Marks)

a) Find the first term and common difference if given 9^{th} term is 29 and 14^{th} term is -6. **(5 marks)**

b) Find the sum of the sequences 1,3,5, ... ,559 **(7 marks)**

c) Find the 9^{th} term of $1, -1, 1, \ldots$. Hence, find sum of the first 9 terms. **(8 marks)**

Question 4 (30 Marks)

a) Find the derivative of the following:

i. $y = -3x^4 - 3x - 9$ **(2 marks)**

ii. $y = (2x - 3)(5 - 7x^3)$ **(5 marks)**

iii. $y = \dfrac{5x - 8}{x^2 - 6x + 4}$ **(6 marks)**

iv. $y = (4x^3 - 2x^2 + 5)^4$ **(3 marks)**

b) Integrate $\int x^7(x^8 - 10)^4 \, dx$ **(6 marks)**

c) Evaluate

$$\int_1^3 \left(2x^3 - \frac{4}{x^2}\right) dx$$ **(8 marks)**

End of Page.

Course: Essential Mathematics
Code: PEM0044

Summary of Formulas

Basic Rules of Differentiation

(a) $f'(c) = 0$
(b) $f'(x) = nx^{n-1}$
(c) $cf(x)$: $cf'(x)$
(d) $f(x) \pm g(x)$: $f'(x) \pm g'(x)$
(e) Product rule, $f(x) = u.v$: $f'(x) = uv' + vu'$
(f) Quotient rule, $f(x) = \frac{u}{v}$; $f'(x) = \frac{vu' - uv'}{v^2}$
(g) Chain rule: $\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$
(h) General power rule: Derive $[f(x)]^n = n[f(x)]^{n-1} f'(x)$

Basic Rules of Integration

(a) $\int k\,dx = kx + C$
(b) $\int x^n\,dx = \frac{x^{n+1}}{n+1} + C$
(c) $\int kf(x)\,dx = k\int f(x)dx$
(d) $\int (f \pm g)(x) = \int f(x)dx \pm \int g(x)dx$